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Andrew Kalotay, Ph.D., is a pioneer and leading authority on the valuation of municipal, agency, and corporate bonds, and a noted expert on the practice of debt management. He is a prolific contributor to the literature on fixed income topics such as bond refunding and the use and misuse of interest rate derivatives.

Dr. Kalotay's innovations include the Ratchet Bond (automatic no-cost refunding feature) and the Volatility Reduction Measure for hedge effectiveness testing. He invented the concept of refunding efficiency—a widely used tool in the management of callable debt. He is an inductee into the Fixed Income Analysts Society Hall of Fame, and a member of Risk Who's Who.

In 2009 the Mortgage Bankers Association released Dr. Kalotay's consumer manual for homeowner mortgage decisions. Within the past year he was awarded patents for MBS prepayment modeling, an option-based approach to refinancing home mortgages, and a method for valuing estate puts (survivor's options in retail bonds).

Dr. Kalotay is a major advocate of option-based decision making among municipal issuers. Current refunding practice generally leaves money on the table and hurts taxpayers. His advance refunding calculator was recently launched on the Bond Buyer website.

In 2011, Dr. Kalotay testified at an SEC hearing in Birmingham on municipal swaps, where he estimated that the 'hidden tax' on municipalities from mispricing of swaps on entry amounted to about \$20 billion over the last five years.

His January 27, 2012 article on refundable 5% bonds in the Bond Buyer was the most read article over several weeks. It exposes issuers to churning and results in a duplication of tax-exempt bonds supporting a single project (a point of interest to the IRS).

He serves on the MSRB advisory committee that oversees the certification of municipal advisors.

PROFESSIONAL EXPERIENCE

1990-Present *Andrew Kalotay Associates, Inc.*
President
1994-1997 *Polytechnic University*
Director: Center for Finance and Technology
1981-1990 *Salomon Brothers Inc.*
Director-Research, Group Manager: Bond Portfolio Analysis Department
1978-1981 *Dillon Read & Co. Inc.*
Senior Analyst
1972-1978 *AT&T*
Supervisor: Corporate Planning, Financial Planning
1968-1972 *Bell Telephone Laboratories*
Member of Technical Staff: Operations Research, Systems Engineering.

ACADEMIC EXPERIENCE (*Selected*)

Polytechnic University, Professor of management and Director of first M.S. in financial engineering program in the US (1994-1997)
Fordham University, Professor of finance (1990-1994)
Columbia, Adjunct professor of finance (1987)
Wharton, Adjunct professor of finance (1979)
Associate editor and frequent referee for several journals

EDUCATION

University of Toronto, Ph.D. Mathematics. Thesis in Statistical Inference (1968).
Queen's University, M. Sc., Mathematics. Thesis in Algebraic Coding Theory (1966).
Queen's University, B. Sc. (Honors), Mathematics (1964).

MEMBERSHIPS & AFFILIATIONS

American Finance Association
Financial Management Association, Trustee (1989-1994), Board Member (2005-2007)
International Association of Financial Engineers
Fixed Income Analysts Society of New York, President (1988-1989)

AWARDS

Inducted in 1997 into the *Fixed Income Analysts Society Hall of Fame*
Franz Edelman Award for paper on optimum bond calling (1979)
Charter member of Risk Who's Who

OTHER

Chess master (Member of 1966 Canadian Olympic team)
Renowned chess problemist

SELECTED EXPERT WITNESS ENGAGEMENTS RE: MUNICIPAL BONDS

Radian Assurance v. College of Sante Fe, et al.

(2011) re: dispute about swap insurance

Witness for college

Western Monmouth Utilities Authority vs. Jersey Capital Markets Group, Inc., et al.

(2005) re: negligence in wording of indenture

Witness for municipality

Irvine Water District vs. Merrill Lynch re: Orange County (1998).

Witness for Merrill Lynch

Bondholders vs. Hennepin County (1996) re: Calling of not-yet-refundable bond.

Witness for bondholders.

Commonwealth of Pennsylvania (1996) vs. Prudential Securities, Inc. re: Yield burning.

Witness for Prudential

Commonwealth of Massachusetts (1995) vs. Goldman, Sachs & co. re: Yield burning.

Witness for municipality

Massachusetts Water Resources Authority (1994) vs. Merrill Lynch, et al. re: Yield burning.

Witness for municipality

SELECTED PUBLICATIONS

Municipal Finance

Refereed Journals

What Makes the Muni Yield Curve Rise?

Journal of Fixed Income (Winter 2009)

Callable Bonds: Better Value Than Advertised?

Journal of Applied Corporate Finance (Summer 2008)

Insuring Callable Bonds: Selecting the Right Payment Plan

The Journal of Risk Finance (Spring 2003)

Subsidized Borrowing and the Discount Rate

Municipal Finance Journal (Winter 1999)

The Timing of Advance Refunding of Tax-exempt Municipal Bonds

Municipal Finance Journal (Summer 1998)

Trade Press

What's Special About Muni Swaps? Nothing, Actually

Bond Buyer (February 4, 2011)

Build America Bonds: Seeking the Missing Option

Bond Buyer (May 11, 2009)

The Right Discount Rate Could Save Your Life

Financial Engineering News (January/February 2007)

Bond Valuation

The Management of Sinking Funds: The World Bank Experience — *The Journal of Fixed Income* (June 1993)*

A Model For Valuing Bonds And Embedded Options — *Financial Analysts Journal* (May/June 1993)*

The Valuation and Management of Bonds with Sinking Fund Provisions — *Financial Analysts Journal* (March/April 1992)*

Sinking Fund Prepurchases and the Designation Option — *Financial Management* (Winter 1992)

An Analysis of Original Issue Discount Bonds — *Financial Management* (Autumn 1984)

Innovations in Corporate Finance: Deep Discount Private Placements. — *Financial Management* (Spring 1982)

Sinking Funds and the Realized Cost of Debt — *Financial Management* (Spring 1982)

On the Management of Sinking Funds — *Financial Management* (Spring 1981)

Topics in Fixed Income — *Financial Engineering News*

The Right Discount Rate Can Save Your Life (January/February 2007)

When It's Time To Get Off The Tree (November/December 2006)

Is There a Financial Engineer in the House? (March/April 2006)

Some Bonds Are Worth More Dead Than Alive (September/October 2006)

Risk and Liability Management

Refunding Efficiency: A Generalized Approach — *Applied Financial Economic Letters* (Vol. 3, May 2007)*

A Framework for Corporate Treasury Performance Measurement — *Journal of Applied Corporate Finance* (Winter 2005)
 Testing Hedge Effectiveness for FAS 133: The Volatility Reduction Measure — *Journal of Applied Corporate Finance* (Winter 2001)*
 The Challenge of Managing Credit Spreads: New Tools on the Horizon — *Journal of Applied Corporate Finance* (Winter 2000)*
 Subsidized Borrowing and The Discount Rate: The Case of Municipal Capital Budgeting and Financial Management — *Municipal Finance Journal* (Winter 1999)*
 Puttable/Callable/Reset Bonds: Inter-market Arbitrage with Unpleasant Side Effects — *Journal of Derivatives* (Summer 1999)*
 Ratchet Bonds: Maximum Refunding Efficiency at Minimum Transaction Cost — *Journal of Applied Corporate Finance* (Spring 1999)*
 Premium Debt Swaps: The Best of Both Worlds? — *Financial Management* (Autumn 1998)*
 The Timing of Advanced Refunding of Tax-Exempt Municipal Bonds — *Municipal Finance Journal* (Summer 1998)*
 Refunding Tax-Exempt Corporate Bonds in Advance of the Call — *The Financier* (Vol. 1, No. 1, February 1994)*
 How to Succeed in Derivatives Without Really Buying — *Journal of Applied Corporate Finance* (Vol. 6, No. 3, Fall 1993)*
 The Sure Thing—Bond Refunding: How Operations Research Made Its Mark on Wall Street — *OR/MS Today* (April 1993)
 A Tale of Two Bond Swaps — *Journal of Financial Engineering* (December 1992)*
 Embedded Call Options and Refunding Efficiency — *Advances in Futures and Options Research*, JAI Press Inc. (Vol. 3, 1988)*
 Refunding Considerations under Rate-Base Regulation — *Financial Management* (Autumn 1984)
 Optimum Bond Calling and Refunding — *Interfaces* (November 1979)
 Tax Differentials and Callable Bonds — *The Journal of Finance* (September 1979)*
 On the Advanced Refunding of Discounted Debt — *Financial Management* (Summer 1978)
 A Comment on Bond Refunding — *Financial Management* (Autumn 1976)

Mortgages and Mortgage-Backed Securities

MSRS

The True Cost of No-Cost Mortgages — *Mortgage Risk* (October 2007)*
 Optimal Refinancing: Bringing Professional Discipline to Household Finance —
 Forthcoming in *Applied Financial Economic Letters* (2007)*
 A Pointer on Points — *OR/MS Today* (June 2007)*
 An Option-Theoretic Prepayment Model for Mortgages and Mortgage-Backed Securities —
International Journal of Theoretical and Applied Finance (December 2004)*
 The Perils of Monte Carlo — *Derivatives Strategy* (June 1994)

Books and Contributed Chapters

Valuation of Municipal Bonds with Embedded Options — *Handbook of Municipal Securities* (2008)
 An Option-Theoretic Approach to MBS Valuation — *The Handbook of Mortgage-Backed Securities*, 6th ed., F. J. Fabozzi, Ed. (McGraw-Hill, 2006)*
 Introduction To The Valuation Of Bonds With Embedded Options — *The Handbook of Fixed Income Securities*, 4th ed. et al., F. J. Fabozzi, Ed. (Irwin, Chicago, 1994)*

Managing the Capital Structure — *The Handbook of Modern Finance*, Warren, Gorham & Lamont, Inc. (1989)*

The Financial Manager's Guide to Evaluating Bond Refunding Opportunities (Ballinger, Massachusetts, 1988)*

Long-Term Debt and Equity Markets and Instruments — *The Financial Handbook*, John Wiley & Sons, Inc. (1981)

Operations Research and Statistics

Joint Capacity Expansion Without Rearrangement — *Operational Research Quarterly* (1975)*

Two Comments on the Deterministic Capacity Problem — *Management Science* (May 1974)

Capacity Expansion and Specialization — *Management Science* (1973)

Structural Solution to the Linear Calibration Problem — *Technometrics* (November 1971)

* *Co-authored*

RECENT PRESENTATIONS

Regionals Can Move Up to the Majors with Option-based Analytics (Bond Buyer Regional Bond Dealer Conference, Miami FL, March 18, 2010) *forthcoming*

Exposing MBS Model Risk: Look Outside the Black Box (PRMIA, New York NY, February 25, 2010)

Municipal Bond Market: Challenges and the Way Forward (Fixed Income Analysts Society, New York, NY, December 2, 2009)

Build America Bonds: Changing the Muni Landscape (Financial Management Association, Reno, Nevada, October 21-24, 2009)

Overcoming the Data Hurdle In Muni Bond Analysis (Financial Management Association, Reno, Nevada, October 21-24, 2009)

Pricing Consistency Across Asset Classes (Risk, New York NY, September 29, 2009)

Mortgage Prepayment Models and Risk Perception (GARP, New York NY, September 15, 2009)

Meeting the Challenge of Real-time Pricing (Northeast Municipal Buyers Roundtable, New York NY, September 4, 2008)